

# **VARIABLE OPTICAL ATTENUATOR ON AN ELECTRO-OPTICAL LAYER**

## **ABSTRACT OF THE DISCLOSURE**

The intensity of signals in optical networks can be controlled using a variable optical attenuator (VOA). The present invention is a VOA that is particularly well suited for optical networks, for example to provide channel-by-channel normalization of gain control of wavelength division multiplexed signals. The inventive VOA includes a waveguide having an electro-optical material and electrodes that produce an electric field within the electro-optical material when a voltage difference is applied to the electrodes. The electro-optical material can either be a substrate or can be a layer deposited on a substrate. In an alternative embodiment, a polarization independent VOA is formed from a waveguide that includes two, end-to-end waveguides. In one embodiment, a 90 degree polarization rotator is provided between the two waveguides. In another embodiment, each of the two waveguides has a different electro-optical material selected to selectively pass one of two 90 degree polarizations.